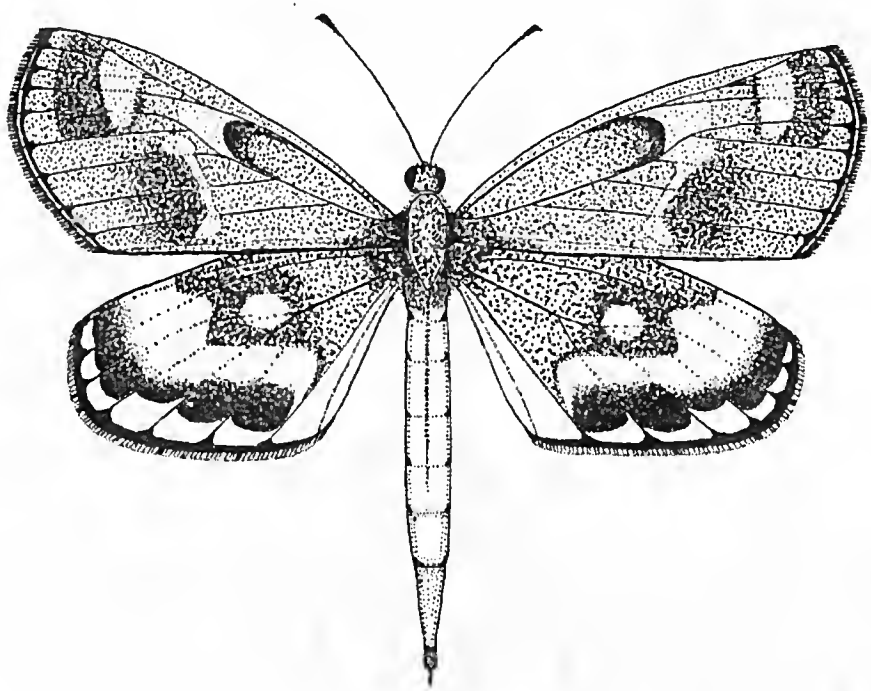
VICTORIAN ENTOMOLOGIST

VOL . 40 No. 5 October 2010

Print Post Approved PP 349018/00058 Price: $ 3.00



News Bulletin of The Entomological Society of Victoria Inc.

THE ENTOMOLOGICAL SOCIETY OF VICTORIA (Inc)

MEMBERSHIP

Any person with an interest in entomology shall be eligible for Ordinary membership. Members of the Society include professional, amateur and student entomologists, all of whom receive the Society's News Bulletin, the Victorian Entomologist.

OBJECTIVES

The aims of the Society are:

(a) to stimulate the scientific study and discussion of all aspects of entomology,
(b) to gather, disseminate and record knowledge of all identifiable Australian insect species,
(c) to compile a comprehensive list of all Victorian insect species,
(d) to bring together in a congenial but scientific atmosphere all persons interested in entomology.

MEETINGS

The Society's meetings are held at the 'Discovery Centre', Lower Ground Floor, Museum Victoria, Carlton Gardens, Melway reference Map 43 K5 at 8 p.m. on the third Tuesday of even months, with the exception of the December meeting which is held on the second Tuesday. Lectures by guest speakers or members are a feature of many meetings at which there is ample opportunity for informal discussion between members with similar interests. Forums are also conducted by members on their own particular interest so that others may participate in discussions.

SUBSCRIPTIONS (2010)

Ordinary Member	$30 (overseas members $32)
Country Member	$26 (Over 100 km from GPO Melbourne)
Student Member	$18
Electronic (only)	$20
Associate Member	$ 7 (No News Bulletin)
Institution	$35 (overseas Institutions $40)

Associate Members, resident at the same address as, and being immediate relatives of an ordinary Member, do not automatically receive the Society's publications but in all other respects rank as ordinary Members.

LIFE MEMBERS: P. Carwardine, Dr. R. Field, D. Holmes, Dr. T. New, Dr. K. Walker.

Cover design by Alan Hyman.

Cover illustration: The pale Sun Moth, *Synemon selene* Klug, is an endangered species restricted to perennial grassland dominated by *Austrodanthonia* in Western Victoria. It is now extinct in SA, and was presumed extinct in Vic. until its rediscovery, in February 1991, by the late Frank Noelker and Fabian Douglas. The Victorian Populations are parthenogenetic with all specimens comprising females, a most unusual trait in the Castniidae. Illustration by Michael F. Braby.

Notes from the Entomological Society of Victoria Excursion:

Environment Protection Authority

Freshwater Labs Tuesday 17th August 2010

Present: P. Marriott, P. Lillywhite , M. Fiedel, S. Curle, V. Curle, J. Grubb, , H. Falk, R. St Clair, T. Barberi, L. Rogan, F. Hriehwazi, J. Fraser,

Apologies: L. Levens, D. Dobrosak, A. Glaister, F. Douglas, D. Stewart, C. Timewell, P. Carwardine, M. Endersby, I. Endersby, M. Halsey

Notes by S.Curle

This year's excursion was kindly hosted by John Dean and Ros St Clair at the Environment Protection Authority Freshwater labs in Macleod.

John and Ros met us and showed us around their laboratory. They explained that the EPA is a regulator and responsible for overseeing the health of the environment.

The Science Labs, all based at Macleod, are organised into a number of work groups.

The air quality monitoring section, amongst other things, monitors air quality, provides smog alerts, works with aerosols etc. There is also a Marine studies section, which is involved in the monitoring of the Gippsland Lakes and Western Port. The vehicle inspection unit is also based at Macleod, and tests motor vehicles for excessive noise. And finally the Freshwater section, which is primarily concerned with the biological monitoring of rivers and streams in Victoria.

The freshwater group use a method of monitoring known as RBA, or Rapid Biological Assessment. This is a widely accepted methodology. Sampling methods are standardised and collected invertebrates identified to family level only. Using this method a large number of samples can be collected and processed over a short period of time. Over the years thousands of sites have been sampled across the state, some sites sampled 2 or 3 times only and others sampled twice a year for 15 or more years.

The state itself is divided into regions based on bio-geography - Highlands, Forests of type A and B, Cleared Hills, Coastal Plains (Murray and Western Plains).

Normally, each site is sampled twice a year, once in spring and once in autumn. At the site all available microhabitats are sampled, since different habitats often support different invertebrate communities. Standardised samples are collected over 10 metres of stream, the contents of the nets are transferred to white sampling trays and the animals hand picked in the field and transferred into 70% ethanol. A water sample is also collected for water quality analysis, and details of the in stream and surrounding habitat recorded (land use, riparian vegetation, stream substrate etc).

The RBA approach provides a broad brush assessment of river health using family level data. Data is provided to the DSE for incorporation into their indexing of stream condition, as well as to the Catchment Management Authorities to assist in their management of the streams.

Biological objectives that are based on invertebrates have been incorporated into SEPPs (State Environmental Planning Policies) and include the following 5 indicators of environmental quality objectives:

AUSRIVAS bands – Australia wide approach based on the ratio of observed to expected Families at a site. The AUSRIVAS model is based on the relationship between the Families present at established, minimally impacted reference sites and a suite of habitat features of those reference sites. Habitat data for any additional site can be plugged into the AUSRIVAS model and a list of expected Families generated. Comparison of observed Families at a site with predicted (Expected) Families allows an assessment of the health of that site.

SIGNAL scores – All aquatic families found in Victoria have been allocated a signal index. If a family is sensitive and only found at really good sites it may have an index of 9. On the other hand, a bloodworm which is widely distributed and often found in very degraded sites could perhaps have an index of 1 or 2. By averaging the indexes for all the invertebrate Families at a site a SIGNAL score for that site is generated. A SIGNAL score of 5 would indicate a fairly ordinary site.

Number of invertebrate Families.

Number of Key Invertebrate Families

Number of EPT Families (Ephemeroptera-mayflies; Plecoptera-stoneflies; Trichoptera-caddisflies).

Taxonomy

Some detailed studies require identification of invertebrates to species level. Over the years Ros and John have had to undertake basic taxonomic research to enable the identification of many of the invertebrate species in their samples. Many insects are undescribed, and even if described and named often it is the aerial adult only, and aquatic stages (nymphs and larvae) remain unknown.

This has required the rearing of many species to associate the immatures with their adult stage. A reference collection of unassociated larvae has also been developed with standardised designations (e.g. Tipulidae EPA sp.36) to allow consistent identification. This designation is retained until such time as a formal identification can be made.

The EPA now has a microscope set up with camera equipment and auto montage software, which allows them to photograph specimens and produce their own keys.

John and Ros displayed many of the keys they have produced. They also displayed one of their papers describing a new species of Stonefly that they discovered at Hopkins Falls near Warrnambool. This is an unusual species which has minute wings and is unable to fly. They have named it after Ken Walker at the Melbourne Museum (*Dinotoperla walkeri*), which seems very appropriate for a beast that cannot fly.

John and Ros set up the lab with a variety of displays for us to look at and explore, including laptops with presentations (Rapid Biological Monitoring and images of insects), stereomicroscopes with various specimens, a compound microscope with slides of chironomid head capsules, posters, identification keys and reference material. John also demonstrated the auto montage photography equipment.

We would like to thank John and Ros for their kind hospitality, time and patience in enabling us to see some of their work, the work of the EPA at Macleod, and for making this a thoroughly enjoyable excursion.

General Business:

We ran out of time to complete any of the more formal parts of the meeting. In addition, we did not have the required quorum of 15 people available to vote in the constitution amendments.

Next Meetings:

2010:			
Month	*Date*	*Planned event*	
September:	21st	Council meeting	
October:	19th	Members meeting	Jim Tuttle—Sphingidae
November:	16th	Council meeting	
December:	14th	Members meeting and presentations	Please note, December's meeting date is second Tuesday of December to try and avoid Christmas celebrations.

If you are planning to attend any of these meetings; please refer to the website for any last minute amendments.

Meeting closed at 21:30

Meeting of the Council 21 September 2010

Present: P. Carwardine, I. Endersby, P. Marriott, L. Rogan
Apologies: S. Curle, D. Dobrosak, M. Fiedl, P. Lillywhite
Notes: Ian Endersby

As there were insufficient members to form a quorum, information was shared but no decisions were made.

The meeting was held at Museum Victoria and opened at 17:09

Correspondence:

A forthcoming book on the Butterflies of Australia, by Orr and Kitching, has been advised to members on the email list and will be repeated in the newsletter.
An offer of Association Liability Insurance from Rowland House Insurance Brokers. The per capita charge for our level of membership is still prohibitively high.
Australian Journal of Entomology 49 (3) August 2010 and *Myrmecia* 46(3) August 2010

Treasurer's Report:

Account Balances – General Account $6,628; Le Souëf Account $5,504; Publishing Account $11, 794. Ten members are still unfinancial for 2010 and their membership will be terminated. Under the Rules of the Society this could have been enforced months ago.

Editor's Report:

The October issue is almost complete and it is planned that the December issue will include colour plates. The December issue will also include the index for the year which will particularly aid those who have their volumes bound. An article by Kelvyn Dunn on the History of ENTRECS is being revised. The August 2010 issue of the news bulletin included a note on the Lepidoptera: Geometridae: Larentiinae which recognised new synonymies. While the *Victorian Entomologist* has the frequency and breadth of distribution to conform with ICZN it is rarely refereed and carries a disclaimer that scientific names are not intended for permanent scientific record within the meaning of the Code. It is not appropriate to publish such taxonomic changes in our News Bulletin and a medium is being sought elsewhere to publish them.

General Business:

2011 Meeting Schedule

2011:			
Month	*Date*	*Planned event*	
January:		No meeting	
February:	15th	General Meeting	Museum of Victoria Live Exhibits
March:	15th	Council Meeting	
April:	19th	AGM	Ken Harris: Madagascar
May:	17th	Council meeting	
June:	21st	General meeting	Members Presentations
July:	19th	Council meeting	
August:	16th	Members excursion	TBA
September:	20th	Council meeting	
October:	18th	General meeting	TBA
November:	15th	Council meeting	
December:	13th	General meeting	Members' presentations Please note, December's meeting date is second Tuesday of December to try and avoid Christmas celebrations

Publications:

Sales to date of MoV1 are 750; MoV2 575; CSI 250. Work is progressing on MoV3 and MoV4.

Overseas Subscriptions.
In this financial year alone, seven copies of our journal sent to Institutions in Germany and America have gone astray. Replacing them adds considerably to our costs and consideration should be given to only offering electronic copies to overseas institutions. This cannot be implemented until the 2012 subscription year as most agencies have already advertised the 2011 rates.
Parks Victoria River Quality Assessments

The Society has been approached by Parks Victoria to see if we are able and prepared to sample the Aire and Tidal Rivers for invertebrates to assess water quality. Although the Ranger in Charge at the Otway National Park was not aware of this approach he is keen for Society members to sample invertebrates in the Park. This activity will be pursued with the Parks Victoria staff and the Ranger in Charge

The meeting was closed at 18:20

Overview of the Butterfly Database: Part 4 – Personal contributions (KLD)

Kelvyn L Dunn (Email: kelvyn_dunn@yahoo.com)

Introduction

This fourth piece investigates the author's own sampling, which at 16 percent of the database is an important (but small) component. To analyse the spatial and temporal skews the whole database is split into two independent samples; (1) 'my data set', which specifies my personal contributions (KLD) and (2) the 'Remainder', that being the other 84% of information. The 'whole database' indicates the total Dunn & Dunn data warehouse holdings.

10. Personal fieldwork across Australia – driving forces, vouchers and observations

During the history of the project and earlier, I have travelled widely in Australia (**Figure 1**) recording species of butterfly as 'encounter data'. Opportunities have not arisen for extensive survey inland, but intensive focus in coastal and near-coastal regions of southern and eastern Australia is evident. In process, I amassed a set of specimens of most taxa as a tool to aid my identifications and maintain currency of skills. My contributions to date (23,450 records) comprise field sightings (unhandled close

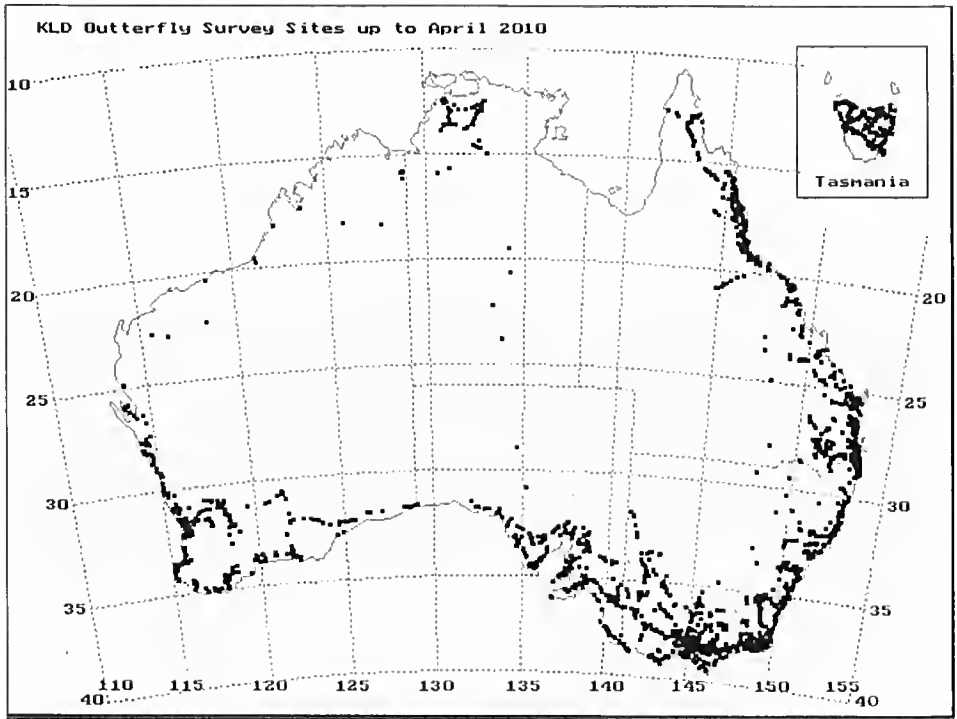


Figure 1. The author's survey sites up to and including April 2010 (n=1,915 sites, each differing by one-minute resolution).

observations) (65.5%), verified encounters (captured and released unharmed) (1.7%), photographic images (1.4%), and voucher specimens (31.3%) – most of which are now in museums in Australia and USA. The majority (68.7%) has been left in the field (16,104 encounter records). Supportively, an increased use of photography (but which presupposes that the field images will depict the essential taxonomic characters for fine identification) has made for a collative approach that has been both adaptive and flexible. Purists might argue that retention of vouchers (preserved specimens) strengthens the validity of the encounter data to the highest degree (Dunn & Dunn 2006: see *Note 8*), which it does, but this traditionalist approach needs balance against broader concerns for conservation and archive storage constraints (Dunn 2008). Hence, I have lent towards vouchers for those groups in which the species can be difficult to distinguish. That selection has hinged on my field experience, knowledge of spatial and temporal distributions, and time availability to dry mount and finely label those taken (irrespective of their wing wear as assessed after the sampling event).

For many butterfly enthusiasts their collection is the driving force and the data it contains rank as a secondary contribution. Survey and exploration are often (but not always) species-directed rather than aimed to gain new ecological or biological information or augment the knowledge base of distributions. To this end, the popular trend towards selection of pristine specimens for the cabinet (Sands 1999), with replacement of lower quality examples over time (Asher *et al.* 2001) has blinkered seasonal knowledge. Even in well represented regions this will have skewed encounter data in collections towards times of emergence when adults are choice-conditioned. Although off-season sampling will more likely expand upon published regional knowledge and museum records of adult temporality, collectors would argue that the retention of very worn, damaged, or aged specimens accentuates a tatty look to the cabinet series. Given that aesthetics will likely prevail, collectors compiling regional species lists should be mindful of the following. In aged adults the distinguishing wing patterns may become indistinct, severely abraded or lost, which can lead to mistaken identifications in the field in areas where very similar species coexist. Observers can improve rigour here by giving those adults in very poor condition a closer inspection, ideally by in-hand verification (circumstances permitting) and with retention of vouchers where there has been suggestion of a temporal edge creep linked to an unusual season (eg. Dunn 2010a).

11. Spatial comparison of skews in the author's sampling and the database remainder

Division of Australia into eastern/western and northern/southern sectors as defined (Table 4) broadly balances land areas for comparisons of the butterfly data accumulated. Dunn (2009) disclosed skews in the whole database towards an over-sampling of the south and east, relative to the north and west, respectively. This unevenness stems from (1) extremes in faunal richness (Kitching & Dunn 1999) and (2) collector opportunism (Dunn 2009). The sharpest gradients in species richness are towards the northern and eastern coastal regions of the continent, where counts exceed 80 species (Figure 2). The inland and west has a much lower (but more uniform) diversity, which for the most part is less than 40 species (**Figure 2**). Local opportunistic field work means that surveys are often conducted close to areas of residency due to convenience, and may involve sampling habituation, which is the tendency to rework productive sites, albeit that some of those sites may be farther afield (Dunn 2009).

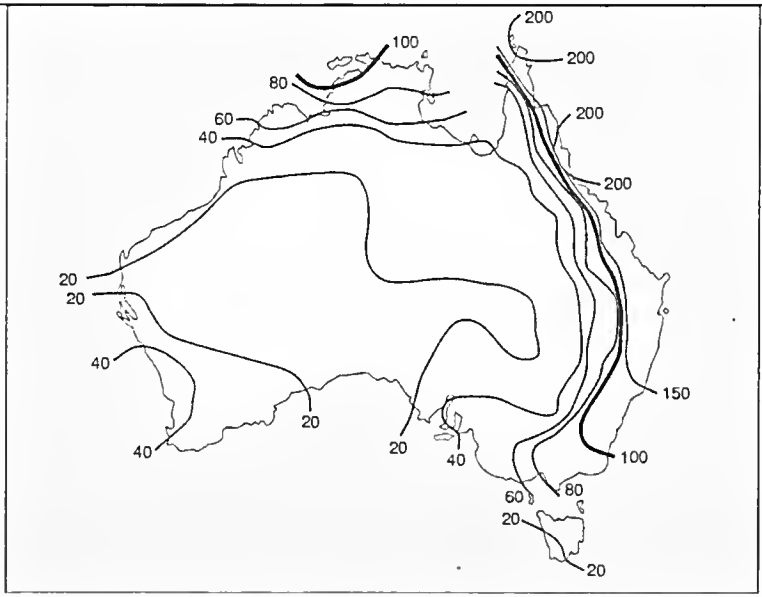


Figure 2:
Species richness isopleths in Australia (Modified after Kitching & Dunn 1999; Copyright CSIRO (http://www.publish.csiro.au/pid/2110.htm);
Reprinted from Dunn & Dunn 2006).

(a). East-west disparity: Eastern Australia, as defined by longitudes greater than and equal to 135° 00'E, contains 92% of the national fauna compared with 41% recorded in the west (calculated from Table 4). Statistically, the much greater species richness in the east relative to the west (Figure 2) should mean that more records would accumulate from eastern Australia if records were compiled at random (Dunn 2009). Moreover, the eastern residency of most historic and contemporary contributors has augmented this sway in accumulations. Not surprisingly, 90% of records in the database remainder have come from the east (**Table 4**), and a very similar bias (91%) exists in my data set (Table 4) – a skew of about 10:1. Determining 'catch' compensates for the 9:4 (2.25:1 as calculated from Table 4) difference in richness between these two regions. For my records, the denominator is the total species *personally encountered* per region (rather than the total faunas) which balances for field experience. My weighting towards the east is thus 3.8-fold (Table 1) and approaches the four-fold distortion in the database remainder. That said, despite having sampled at many sites across the western portion of Australia (Figure 1), its great distance from my areas of residency has limited opportunities to revisit these sites (or explore others) to boost the number of records and balance catches within my data set.

(b). North-south disparity: Southern Australia, as defined by latitudes greater than and equal to 25° 00'S, contains 63% of the national fauna compared with 81% recorded in the north (calculated from Table 4). The whole database (my data and the Remainder) has a strong bias towards southern Australia, despite the south having less than 79% of the richness of the north (calculated from Table 4). There have been few workers based in northern Australia over the last 160 years, which has unbalanced the accumulations. Indeed, 64% of the records in the Remainder have come from southern Australia (Table 4), and a greater bias (73%) exists in my data set – in fact, the southern region is where I have seen the highest portion of species (85%) (Table 4). Here again, determination of catch

Table 4. Regional data composition: field records (compiled May 2010). (Whole database n=145,294 records).

Regions	Records KLD (A1) [%]	Records: Remainder (R1) [%]	Species Seen KLD (A2)	Total fauna (R2)	Species seen % KLD (A2/R2 x100%)	Catch: KLD. Mean records/ species seen (A1/A2)	Catch ratio: KLD	Catch ratio: Remainder
Eastern Australia Longitude E>=135° 00'	21,412 [**91**]	109,424 [**90**]	322	401	80	66.5	**3.8**	**4.0**
Western Australia Longitude E<=134° 59'	2,038 [**9**]	12,226 [**10**]	115	178	65	17.7	**1.0**	**1.0**
Northern Australia Latitude S<=24°59'	6,277 [**27**]	44,030 [**36**]	232	350	66	27.1	**1.0**	**1.0**
Southern Australia latitude S>=25°00'	17,173 [**73**]	77,620 [**64**]	234	275	85	73.4	**2.7**	**2.2**
Political Australia	**23,450**	**121,844**	**342**	**434**	**79**	**68.6**	—	—

NB: The subdivisions of the Remainder sum to 121,650 records (not 121,844); for some contributions the intended localities are vague, ambiguous or remain undetermined at this time (n=194 records). Those without a geocode will not be detected and sorted by the algorithms seeking these requirements.

equalises the species richness disparity of 5:4 (1.27:1 as calculated from Table 4), but in this case it has not moderated the distortion in my records (1: 2.7) (Table 4) which closely matches the two-fold offset in the database remainder. (Table 4). Hence, the sampling bias towards southern Australia in my data set suggests that my sampling focus has been similar to those many serious enthusiasts who laboured before me and who contributed to the museum collections and literature sources utilised to build the remainder of the database.

(c). Overall south-easterly focus: There exists a strong focal point in the region of intersection of the overly sampled east and south epitomised by the massive holdings for Zone F (South-eastern). This floristic zone (Barlow 1985) includes five of the eight capital cities and contains over half the records in the whole database! Once again, such skews are for the large part, due to a history of collectors' residencies in eastern and southern Australia (Dunn 2008, 2009). My periods of residency near Melbourne (Zone F), Canberra (Zone F), Brisbane (Zone F), and in the Maryborough-Hervey Bay area (southern part of Zone D), all located variably south of 25°00′ latitude and well east of 135°00′ longitude, have leaned my efforts towards the south-eastern region too. My catches for the southern and eastern regions (Table 4) are similarly predisposed and align with my average (68.6) for Australia generally (Table 4). Thus, an over-sampling of Zone F where 58% of my field records cluster sways these catchments' representations. Corresponding distortions exist in the Remainder (52%) and these combine in the whole database as excess for Zone F (at 53%). This imbalance will remain as a project limitation until many more records from the five other zones are forthcoming (Dunn & Dunn 2006).

(d). Paucity of records from the inland and contiguous coastal deserts: I have done very little work in the inland of the continent (Figure 1) which includes desert areas and where arid habitat intrudes on the coast. To quantify this, the vast regions of Zone B (Western Shield) and Zone E (Eyre-Murray Basin) (Barlow 1985) can be combined to broadly define the 'inland deserts', 'outback' and 'arid coastal areas'. This enables comparison of the holdings against the floristically richer rest (namely Zones A, C, D, & F) (see Barlow 1985). The 3.7-fold skew in my catch towards the richer coastal areas (as defined by these four zones and again balanced for regional field experience) is identical to the skew in the remainder of the database (Table 5). Indeed, the remote interior has received far less exploration by most butterfly enthusiasts – not just myself – adding to the unevenness in sampling nationwide (Dunn 2009).

Table 5. Data composition: regional aridity (compiled May 2010).

Regions	Records: KLD (A1) [%]	Total species (KLD) (A2)	Records: Remainder (R1) [%]	Total fauna (R2)	Catch ratio (KLD): (A1w/ A2w)/(A1d/ A2d)	Catch Ratio: Remainder (R1w/R2w)/ (R1d/R2d)
Higher rainfall Region (w): (Zones A,C,D,F)	22,462 [96]	336	113,295 [93]	428	3.7	3.7
Arid Region (d): (Zones B & E)	988 [4]	54	8,391 [7]	117	1.0	1.0

NB: The Remainder tallies to 121,688 records, not the national tally (c.f. Table 4); contributions from several remote offshore islands (political Australia) and records reported 'at sea' are beyond the Barlow zones (n=158 records).

12. Personal fieldwork across states and territories

Analysis at the geo-political level is a common approach in biogeography. For the most part, my survey of butterflies across all states and territories (Figure 1) has occurred on an *ad hoc* and opportunistic basis rather than by a structured approach.

(a) Numbers of records and catch: The numbers of records I have contributed from Queensland (Qld), South Australia (SA), Western Australia (WA) and the Northern Territory (NT) are in similar proportions to the database remainder (being within 20%) (Table 6). However, I have sampled less in New South Wales (NSW) (45% below), and Tasmania (Tas.) (33% below), and more in Victoria (Vic.) (53% above) and the Australian Capital Territory (ACT) (100% above) compared with record percentiles in the Remainder (Table 6). The plethora of records in the latter two jurisdictions has hinged on my periods of residency therein. However, four years living in SE Queensland (1988 & 1992-1995) did not notably raise my representation for that much larger state (only 1% above) (Table 6). 'Catch', as the average number of records per species, is a weighted-measure of sampling intensity but this comparison does not consider land area differences. Instead, when adjusted for their richness differences and unit areas per jurisdiction (to balance for record-catchment potentialities), my tallies (as 'unit area catches') are highest for the ACT (350), (Table 6), moderate for Victoria and Tasmania (both 29.8) and lowest for the NT (0.8) and WA (0.7) (Table 6). The ACT, Victoria and Tasmania each has had a history of high collector activity on a square kilometre basis, and were the most intensively worked jurisdictions in the original (1991) data set (n=88,870) (Dunn & Dunn 2006) as they are in the current holdings too (n=145,294) (Table 6).

(b) Numbers of species: I know of no living or deceased observer who has claimed field encounters with all the Australian species *within* the current political boundaries, so saturation is an unlikely expectation of expertise at this time. My efforts are moderate for most jurisdictions, and nationally too, with observations on 79 percent of the fauna *within* political Australia (Table 6) – by definition this measurement excludes an additional 12 or so Australian species which I have seen only beyond the political boundaries (at this time). My lowest tallies are for WA and SA (48% and 47% of the known species seen *within* each state, respectively), and the highest is for Victoria (81%) (Table 6). Obviously, the database censuses *all* of my records, but as a *sample* of the holdings of museums, private collections and literature sources it remains variably incomplete (Dunn 2010b), dated in coverage of other workers' efforts, and does not pretend otherwise (Dunn 2008).

13. Temporal comparisons and skews in the author's sampling and the Remainder

Survey intensity nationwide has varied over the seasons and decades due to the range of climates across Australia and regular droughts (often spanning several consecutive years). The southern bias in both samples means that nearly two thirds of the data will reflect seasonal sampling in temperate regions (see Sect. 11c) rather than the wet-dry tropics. Thus, the catch maximises in the Remainder from October to April with crests in November and January (Table 7). Correspondingly high personal sampling is evident at this same time (compare also record counts & numbers of species encountered) with a plateau in catch for December to February, indicative of the southern seasonal influence on the timing and location of much of my fieldwork.

Table 6. Data Composition: Political regions (compiled May 2010).

Political Regions (States/ Territories)	KLD: No. of records (A1) & [as %]	Remainder: No. of records & (R1) [as %]	KLD: No. of Species (A2) & [% local fauna]	Total species (R2)	Records per 1,000 km² KLD & (Remainder)	KLD: Catch (A1/A2)& [per 100, 000 km²]	Remainder: Catch (R1/R2)& [per 100, 000 km²]
Qld	10,390 [44]	52,592 [43]	267 [74]	362	6.0 (30.4)	38.9 [2.3]	145.3 [8.4]
NSW	2,641 [11]	24,248 [20]	154 [69]	222	3.3 (30.2)	17.1 [2.1]	109.2 [13.6]
ACT	540 [2]	1,236 [1]	64 [74]	87	225.0 (515.0)	8.4 [350.0]	14.2 [591.7]
Vic.	6,791 [29]	22,691 [19]	100 [81]	123	29.8 (99.7)	67.9 [29.8]	184.5 [81.1]
Tas.	524 [2]	3767 [3]	26 [67]	39	7.7 (55.6)	20.2 [29.8]	96.6 [142.5]
SA	599 [3]	4,305 [3]	36 [47]	76	0.6 (4.4)	16.6 [1.7]	56.6 [5.8]
NT	823 [4]	5,594 [5]	79 [59]	135	0.6 (4.2)	10.4 [0.8]	41.4 [3.1]
WA	1,142 [5]	6,831 [6]	62 [48]	130	0.5 (2.7)	18.4 [0.7]	52.5 [2.1]
Political Australia	**23,450 [100]**	**121,844 [100]**	**342 [79]**	**434**	**3.1 (15.9)**	**68.6 [0.9]**	**280.7 [3.7]**

NB: Record tallies for the Remainder do not sum to the national tally as given; Remote offshore islands (as part of political Australia) and records reported 'at sea' are not within these political jurisdictions (n=580 records).

Table 7. Data composition: seasonal accumulations (compiled May 2010).

Month	Records: KLD &[%]	Dated Records: Remainder & [%]	Species seen: KLD	Total species	Catch: KLD	Catch: Remainder
Jul	443 [1.9]	4,010 [3.6]	126	281	3.5	14.3
Aug	471 [2.0]	3,513 [3.2]	90	291	5.2	12.1
Sep	1,007 [4.3]	7,710 [7.0]	131	345	7.7	22.3
Oct	2,589 [11.0]	11,529 [10.5]	227	360	11.4	32.0
Nov	2,674 [11.4]	12,967 [11.8]	225	365	11.9	35.5
Dec	2,668 [11.4]	11,403 [10.4]	172	368	15.5	31.0
Jan	3,777 [16.1]	13,902 [12.7]	248	373	15.2	37.3
Feb	3,304 [14.1]	11,922 [10.8]	204	362	16.2	32.9
Mar	2,986 [12.7]	12,060 [11.0]	214	356	14.0	33.9
Apr	1,731 [7.4]	10,203 [9.3]	150	377	11.5	27.1
May	1,056 [4.5]	6,409 [5.8]	127	323	8.3	19.8
Jun	739 [3.2]	4,270 [3.9]	109	265	6.8	16.1
	23,445	109,898				

NB The totals refer to dated records (of both adults and juveniles) where the month was specified. Hence, the total for the Remainder, for example, is lower in this assortment due to exclusion of records with unspecified months (n=11,946).

The spread of my records, as grouped by five-year intervals, shows two main peaks of activity (Figure 3) associated with several lengthy or interstate field trips during those times. The tally of species encountered for each period (Figure 4) shows positive alignment with increasing field work, although residence in Queensland and several field trips to the tropics have boosted the counts for the fifth period (1990-1994) – my most intense era of field work to date. More time spent in exploratory field work increases expertise, as measured by one's cumulative rate of encounter with recognised taxa (Figure 5). The curve is slowly decelerating (71% of taxa encountered to date) but has not reached an asymptote as yet.

Figure 3. The author's field records presented chronologically (1970-2009).

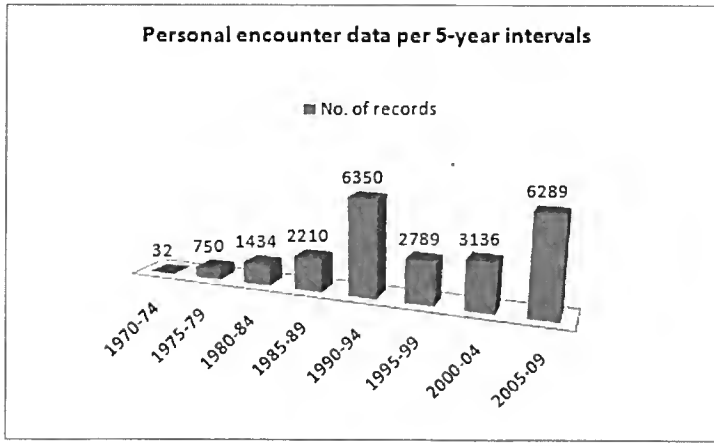
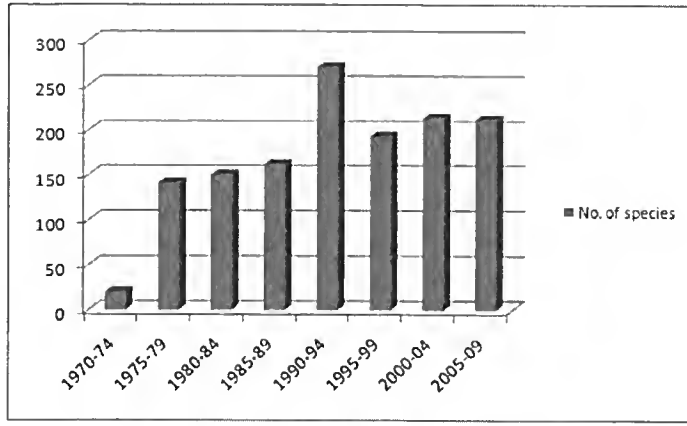


Figure 4. Total number of species encountered by the author for each five-year interval.



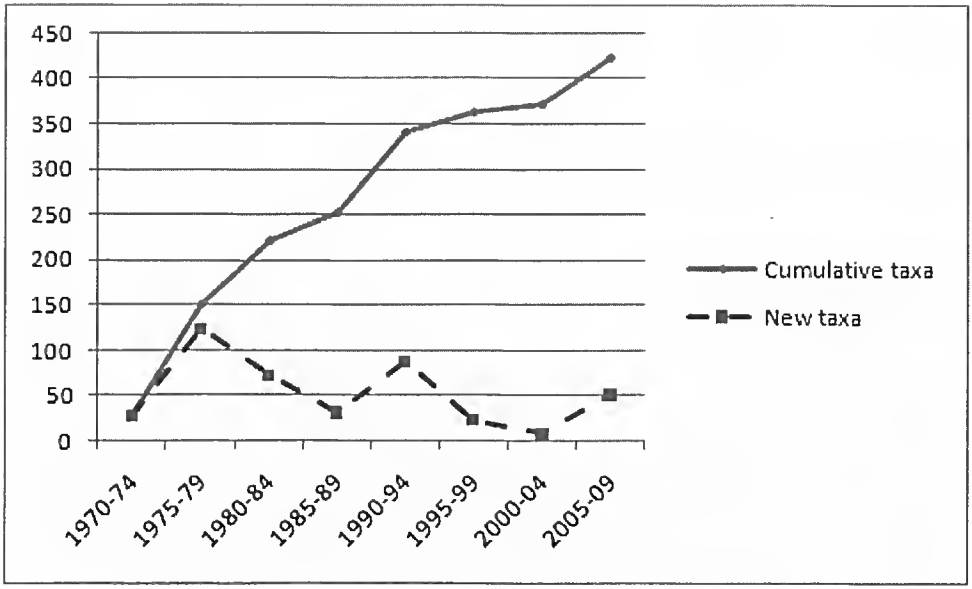


Figure 5. Time-line of first encounters with each taxon (species and subspecies) and grouped by five -year intervals. Subspecies included are those recognised by Braby (2000) augmented by others since named or recognised as occurring within political Australia (total n=597 taxa). The broken line 'loosely joins' these discrete time intervals.

15. Taxonomy: Familial compositions and skews

Unstructured surveys and *ad hoc* accumulations can maximise records of certain groups of species over others and so uneven catches across the five families have accumulated. Table 8 shows higher catches in both data sets for those families containing mostly large and conspicuous butterflies (namely the Papilionidae, Pieridae & Nymphalidae). Generally, these members can be unambiguously identified, if aided by field glasses, in most regions of Australia, and their combined catch for the whole database is higher by 1.8 times (calculated from Table 8). For my data set the combined catch is raised 3.5 times (as moderated by 'species seen' rather than totals), and the Remainder is 1.6 times larger compared with combined catches for the two remaining families (Hesperiidae & Lycaenidae) which are dominated by small, cryptic, similarly patterned and reclusive species. The greater need for in-hand examination of members of the two latter families (to be certain of their identification) means that a proportion of field encounters not seen close enough will be routinely discarded, lowering their average records per species by comparison. Given my interests in gathering records for mapping purposes, it is not surprising that I have compiled more data for high profile groups (rather than those that often require determined searching) compared with their relative proportions in the Remainder (Table 8). It is useful to examine a large collection for anchorage here to aid the interpretation of these findings. In the ANIC the preserved 'catch', as 'database records' per species (but not equivalent to specimens per species) *held in that repository* is still in favour, by 1.3 times, of those groups containing the 'large and conspicuous' species. If used as a benchmark for collections it suggests that higher profile groups will be taken more often, and that this leaning will likely result despite a lesser interest in these three groups by many experienced collectors.

Table 8. Data composition: butterfly families (compiled May 2010)

Family	KLD: No. of records (and as %)	Remainder: No. of records [%]	KLD: Species seen	Total species	KLD: catch	Remainder: catch
Hesperiidae	3,164 [13]	27,392 [22]	106	127	29.8	215.7
Papilionidae	1,738 [8]	6,915 [6]	18	21	96.6	329.3
Pieridae	4,884 [21]	14,627 [12]	31	37	157.5	395.3
Nymphalidae	8,565 [37]	34,322 [28]	68	91	125.9	377.2
Lycaenidae	5099 [22]	38,588 [32]	119	158	42.8	244.2

Conclusion

The distribution of available records in both data sets (KLD & Remainder) has been shown to be geographically, temporally and taxonomically very uneven. Nationwide, my focus has been directed towards coastal areas, with little attention to the far inland where butterfly richness is markedly lower (and where greater effort is needed to find the inhabitant species). Overall, the spatial and temporal skews in my sample very closely align with those in the remainder of the database. This suggests that my interests and those of other workers over the decades have been very similarly directed, namely towards the east and south with particular focus on the region of intersection. Issues of logistics and low richness aside, the outback stands out as an area to redirect future attention

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Checklist of Victorian Carpets (Lepidoptera, Geometridae, Larentiinae) - Part B

E.D. Edwards (1), P. Marriott (2)

(1) ANIC, CSIRO Ecosystem Sciences, GPO Box 1700, Canberra 2601, ACT
(2) 8 Adam St, Bentleigh, Victoria

Abstract

A list of the species in Larentiinae, excluding those of the genus *Chrysolarentia*, known or expected to occur in Victoria is given. Explanatory notes are provided where these are deemed useful.

Introduction

This is the concluding section of the checklist of Larentiinae begun in the August edition of the Victorian Entomologist (Edwards & Marriott 2010). The introductory comments made there should be read in conjunction with the following.

In Edwards & Marriott (2010) the species *Chrysolarentia doliopis* (Meyrick, 1891) was listed. Further examination suggests that collections comprise two species. An undescribed species of *Chrysolarentia* is found in subalpine areas whereas *C. doliopis*, which is similar in appearance but which has fine pectinations on the antennae of the males, was described from Adelaide. It is possible that *C. doliopis* will be found in western Victoria and so remains on the list with an altered status.

Some difficult genera with several undescribed or poorly known species exist. One example of this is the genus *Poecilasthena* where at least four species are undescribed and others are known only from single specimens. This is complicated by the moths' fragile nature, the rareness of some to be attracted to lights and a tendency for the pale green colours to fade to shades of yellow over time. When first collected they are quite beautiful. M.I. Wise, has added a label to a *Poecilasthena* species that says 'I covet this above all others . . .'. Sadly the specimen is now quite drab.

The list below is based on McQuillan & Edwards (1996) and their order of species is preserved here. It includes a recent synonymy by Schmidt (2002) (see note 8 below). Where identifications seem contestable, this has been noted. Species not recorded from Victoria but which probably occur there are also noted. Confirmation of these by readers together with any new records would be appreciated.

Acknowledgements

Appreciation is expressed to A. Kallies and M. Hewish for comments and advice about the manuscript and records.

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Turner, A.J. 1904. Revision of Australian Lepidoptera. Family Geometridae. *Proc. R. Soc. Vict.* **16**: 218 -284.

List

Xanthorhoe xerodes Meyrick, 1891
Xanthorhoe anaspila Meyrick, 1891
Xanthorhoe xanthospila Lower, 1892
Xanthorhoe percrassata (Walker, 1862)
Xanthorhoe anthracinata (Guenée, [1858])
Xanthorhoe strumosata (Guenée, [1858])
Xanthorhoe vacuaria (Guenée, [1858])
Acodia pauper Rosenstock, 1885
Austrocidaria erasta (Turner, 1939)
Epyaxa agelasta (Turner, 1904)
Epyaxa centroneura (Meyrick, 1891)
Epyaxa epia (Turner, 1922)
Epyaxa metoporina (Turner, 1922)
Epyaxa hyperythra (Lower, 1892)
Epyaxa sodaliata (Walker, 1862)
Epyaxa subidaria (Guenée, [1858])
Visiana brujuta (Guenée, [1858])
Visiana excentrata (Guenée, [1858])
Melitulias graphicata (Walker, 1861)
Melitulias leucographa Turner, 1922[1]
Melitulias oriadelpha Turner, 1926
Melitulias glandulata (Guenée, [1858])
Melitulias discophora (Meyrick, 1891)
Aponotoreas cheimatobiata (Guenée, [1858])[2]
Aponotoreas dascia (Turner, 1904)
Aponotoreas epicrossa (Meyrick, 1891)
Aponotoreas petrodes (Turner, 1904)
Anomocentris trissodesma (Lower, 1897)
Anachloris subochraria (Doubleday, 1843)
Anachloris uncinata (Guenée, [1858])
Anachloris tofocolorata Schmidt, 2002
Larentia oribates Turner, 1922
Larentia apotoma (Turner, 1907)
Phrissogonus laticostata (Walker, 1862)
Chloroclystis catastreptes (Meyrick, 1891)[3]
Chloroclystis testulata (Guenée, [1858])
Chloroclystis insigillata (Walker, 1862)
Chloroclystis approximata (Walker, 1869)
Chloroclystis filata (Guenée, [1858])
Microdes villosata Guenée, [1858]
Microdes squamulata Guenée, [1858]
Microdes melanocausta Meyrick, 1891
Microdes diplodonta Turner, 1904[4]
Microdes oriochares Turner, 1922
Horisme mortuata (Guenée, [1858])
Horisme plagiographa Turner, 1922
Ziridava xylinaria Walker, 1863
Epicyme rubropunctaria (Doubleday, 1843)
Poecilasthena urarcha (Meyrick, 1891)[5]
Poecilasthena thalassias (Meyrick, 1891)[6]
Poecilasthena pellucida (T.P. Lucas, 1892)[6]
Poecilasthena pulchraria (Doubleday, 1843)
Poecilasthena euphylla (Meyrick, 1891)
Poecilasthena xylocyma (Meyrick, 1891)
Poecilasthena anthodes (Meyrick, 1891)
Poecilasthena halioloma (Turner, 1907)
Poecilasthena panapala Turner, 1922[7]
Chaetolopha oxyntis (Meyrick, 1891)
Chaetolopha leucophragma (Meyrick, 1891)
Chaetolopha niphosticha (Turner, 1907)
Chaetolopha emporias (Turner, 1904)[8]
Eccymatoge callizona (Lower, 1894)
Eccymatoge fulvida (Turner, 1907)
Eccymatoge morphina (Turner, 1922)
Eucymatoge scotodes Turner, 1904
Hypycnopa delotis Lower, 1903

Notes

1. *Melitulias leucographa* has not been recorded in Victoria. Given its presence in NSW, ACT and Tasmania it is almost certainly present and should be sought in alpine areas.

2. *Aponotoreas cheimatobiata* appears to be part of a group of similar species ranging from Tasmania to northern NSW. *A. cheimatobiata* may be restricted to Tasmania but there is a possibility it is found in Victoria. Turner (1904) noted a record from Mt Erica which he attributed to Lyell. This specimen cannot be located in the Lyell collection.

3. *Chloroclystis catastreptes* in the ANIC appears very variable. The species recorded from Victoria is included under that name in the ANIC but the southern specimens appear to be different to the northern ones and may be a separate species.

4. *Microdes diplodonta* is variable in size and in both the presence and intensity of reddish colours. This requires further investigation. There is a number of undescribed Victorian *Microdes* species in the collections surveyed.

(Continued on page 112)

(Continued from page 111)

5. *Poecilasthena urarcha* appears to include two separate species in the Melbourne collection. They both have a clearly angled termen of the hind wing. This angle is more produced in the undescribed species which is found in the Grampians and the forests east of Melbourne.
6. *Poecilasthena thalassias* and *P. pellucida* were treated as a single species by McQuillan & Edwards (1996) under the name *P. thalassias*. They are separated in the collections in Melbourne and Canberra and are treated separately here. Both have been recorded from Victoria and have been separated on the basis of size and intensity of colour. The patterns can be variable though the larger *P. pellucida* is paler with an almost transparent quality with clearly defined whitish areas.
7. The name *Poecilasthena panapala* has been incorrectly applied to other *Poecilasthena* species in the Melbourne Museum collection. Specimens have been recently collected from subalpine areas in the far east of the state.
8. *Chaetolopha emporias* and *C. pteridophila* Turner (1907) were listed separately by McQuillan & Edwards (1996). Schmidt (2002) examined the two species and considered that they were the same with *C. emporias* as the senior name.

An Extension to the Range of *Cicadetta spinosa* (Goding and Froggatt)(Cicadidae) to Central Victoria

Stephen Smith

On January 24th 2010 an opportunity arose to inspect a sixty acre property at Goldsborough Victoria, fifty kilometres west of Bendigo. The hilly terrain here is very rocky with loose gravels and quartz on hard dry soil mostly covered by Red Ironbark and 'box' type Eucalypts. The property and adjacent State Forest have not been subject to intensive gold prospecting.

A brackish pond on the site is patrolled by the Royal Tigertail, *Parasynthemis regina* (Selys) (Theischinger G and Hawking J, 2006) and from the 'boxes' could be heard a cicada sounding like a creaking branch. A male once obtained proved to be *Cicadetta spinosa* (Goding and Froggatt) (Moulds M, 1990).

C. spinosa was previously known to have an inland distribution in southern Queensland, central NSW and western Victoria where several specimens have been taken from the Little Desert and one from Karadoc near Mildura (Moulds M, 1990).

References:

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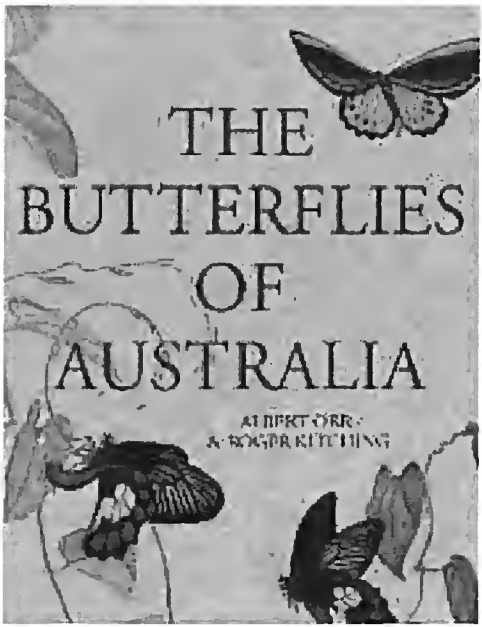
Theischinger G and Hawking J, 2006 The Complete Field Guide to Dragonflys of Australia

New Butterfly Book



Orr, Albert and Roger Kitching.
Butterflies of Australia.
Crows Nest: 2010.
Quarto, paperback, 336 pp.,
colour illustrations. AU$45.00

Due October 2010.

A unique guide to help identify the nearly 400 species to which our continent plays host but with its focus on living butterflies, it is much more than an identification guide. Within its pages is a concise but broad, non-technical introduction to butterfly biology, history, ecology, evolution and conservation. Hundreds of meticulous illustrations show adult butterflies in life, flying or perched, among the plants and animals of their natural habitat, while others document the Australian butterfly species, with beautiful diagnostic half-wing illustrations of pinned specimens. It also explains and illustrates much of the known behaviour and ecology of Australian butterflies, and in so doing meets the needs of both the butterfly watcher and general nature lover. This guide presents a remarkable blend of natural history, science and art.

Dear Editor,

My name is Chris Harrington and I am a subscriber to the Victorian Entomologist. I recently had the pleasure of interviewing the president of the society Peter Marriott for a journalism assignment, and seeing the society welcomes contributions, I thought of forwarding a copy on to you. .....

Sincerely, Chris Harrington

Dear Chris,

Thanks for sharing this well written and informative article. LR Editor

An interview with Entomology Society of Victoria president Peter Marriott

Chris Harrington

To most people, moths are those dreary things that eat our clothes but to Peter Marriott they are 'just fantastic beautiful things'. Marriott is a softly spoken man with a greying beard and beetle brow, who can be found prowling around the Melbourne museum's insect collection. This is where he's preparing his latest book on moths. His passion for moths could almost be described an obsession, an addiction – motholicism. He himself uses words like mothiferous, and mothical. But, when asked about their more colourful sibling, the butterfly, his lips crease up a little.

'Butterflies are just day flying moths,' says Marriott

Interested in natural history since childhood, Marriott first discovered insects, and the world of entomology when he bought a cheap book on butterflies; however, he quickly abandoned butterflies, realising that moths were the go.'The more I looked around, the more I realised how diverse and amazing these moths are.'

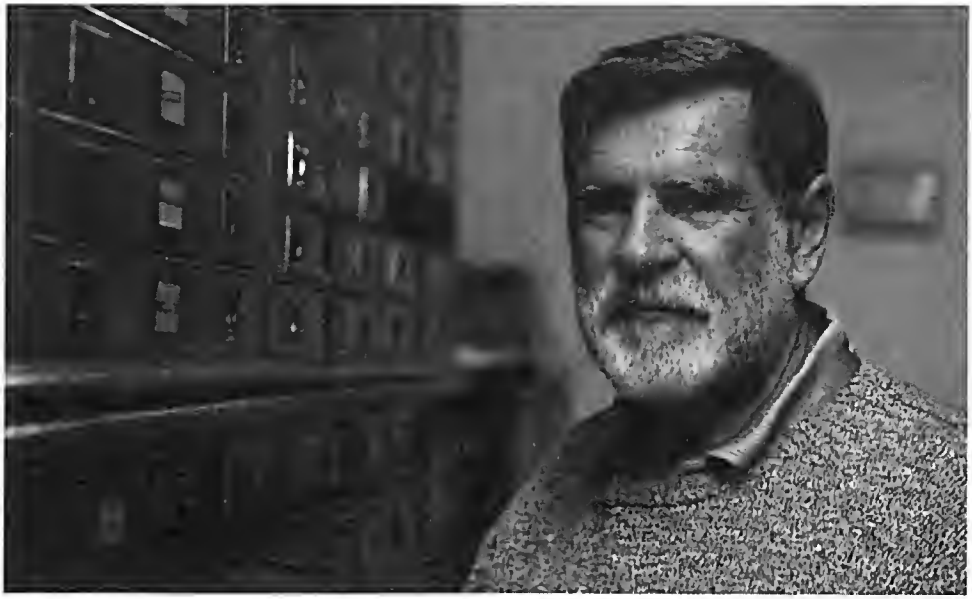
They are also very important to the world says Marriott.

'If we didn't have moths the birds would just not exist because they wouldn't have anything to eat. If you look at a forest, without the insects you don't have a forest. The moths break down the leaves and help recycle them. They will also be involved in pollination, so they are very important.'

He began looking for them at the light above the back door of his home, 'then street lights, shop lights, any place there was light, weird and wonderful places where the creatures are attracted' says Marriott.

Now he uses a white sheet and generator to power his lights. You place the light in front of the sheet and the moths come and land on this sheet.

'The old collectors didn't have lights like we have today. They would take old hurricane lanterns through the bush and bang their boots on the side of trees and see what happened.'



The lack of information available on moths was one of the reasons why he turned his hand to writing. His *Moths Of Victoria* books sit alone amongst the many books on butterflies.

'There's a lot more that needs to be known about moths,' says Marriott.' To start with there are so many moths out there and there's so little information available about them. The *Moths of Victoria* books are basically a way to let people see how much diversity there is out there. When people start looking, they start finding new moths and more interesting things about them.'

He began researching for his first book on silk moths in the year 2000, which was published eight years later. It's quite time consuming when you've got thousands of moths to sort out. Sometimes it can take six hours to sort out as little as 15 specimens, but this is the work that goes into writing my books.'

He has also catalogued over 30,000 moths in the museum's 3 million plus collection and is the current president of Victorian Entomology Society.

One concern he expresses is the lack of interest younger generations are showing towards insects and the natural world.

'It seems to me that growing up, kids get the notion that insects are weird, which is a pity because being interested in any aspect of the natural world will connect you back to reality. It's becoming increasingly difficult to understand that we live in a natural world.'

After a tour through the museum's collection it was easy to see why Marriott is so passionate about moths. Fluorescent blue ghost moths, gigantic atlas moths, owl-eyed saturniidae moths, and tiny geometrid moths present an overwhelming view of nature. How singular and mysterious these creatures are, and how little is known about them.

Australian Journal of Entomology Volume 49, Issue 3 (2010)

ECOLOGY

André Bianconi, Cláudio J Von Zuben, Adriane B De Souza Serapião & José S Govone: The use of artificial neural networks in analysing the nutritional ecology of *Chrysomya megacephala* (F.) (Diptera: Calliphoridae), compared with a statistical model

Piotr Trębicki, Rob M Harding, Brendan Rodoni, Gary Baxter & Kevin S Powell: Diversity of Cicadellidae in agricultural production areas in the Ovens Valley, north-east Victoria, Australia

Sakuntala Muthuthantri, Derek Maelzer, Myron P Zalucki and Anthony R Clarke: The seasonal phenology of *Bactrocera tryoni* (Froggatt) (Diptera: Tephritidae) in Queensland

SYSTEMATICS

Ryan J Hooper, Allan Wills, Bryan L Shearer & Krishnapillai Sivasithamparam: A redescription and notes on biology of *Cisseis fascigera* Obenberger (Coleoptera: Buprestidae) on declining *Eucalyptus wandoo* in south-western Australia

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Adam Slipinski & Wioletta Tomaszewska: Revision of the family Cavognathidae (Coleoptera: Cucujoidea)

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Lisa A Berndt & Geoff R Allen: Biology and pest status of *Uraba lugens* Walker (Lepidoptera: Nolidae) in Australia and New Zealand

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Rob Manning, Hana Sakai & Linda Eaton: Methods and modifications to enhance the abundance of pollen on forager honey bees (*Apis mellifera* L.) exiting from beehives: implications for contract pollination services

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Scientific names contained in this document are *not* intended for permanent scientific record, and are not published for the purposes of nomenclature within the meaning of the *International Code of Zoological Nomenclature*, Article 8(b). Contributions may be refereed, and authors alone are responsible for the views expressed.

ISSN 0310 – 678

Inwards.